CLAIMS

1. A surface-coated cutting tool comprising a coating film on a base, wherein

said coating film comprises a hard layer constituted of a compound selected from a nitride, a carbonitride, an oxynitride and a carboxynitride of at least one primary element selected from a group consisting of the metals belonging to the groups 4a, 5a and 6a of the periodic table as well as B, Al and Si, and

said hard layer satisfies the following:

(a) (hmax – hf)/hmax is at least 0.2 and not more than 0.7,

assuming that hmax represents the maximum indentation depth and hf represents the indentation depth (dent depth) after unloading,

in a hardness test according to nanoindentation,

(b) the thickness of the hard layer is at least 0.5 μm and not more than 15 μm, and

(c) the hardness according to nanoindentation is at least 20 GPa and not more than 80 GPa.

2. The surface-coated cutting tool according to claim 1, wherein

the hard layer is composed of a compound selected from a nitride, a carbonitride, an oxynitride and a carboxynitride of Ti, Al and S.

3. The surface-coated cutting tool according to claim 1, wherein

the hard layer is composed a compound selected from a nitride, a carbonitride, an oxynitride and a carboxynitride of $(Ti_{1-x-y}Al_xSi_y)$ $(0 \leq x \leq 0.7, 0 \leq y \leq 0.2)$.

4. The surface-coated cutting tool according to claim 1, wherein

the primary element contains at least one addition element selected from a group consisting of B, Mg, Ca, V, Cr, Zn and Zr, and

the primary element contains less than 10 atomic % of said addition element.

5. The surface-coated cutting tool according to claim 1, wherein

the hard layer is composed of a compound selected from a nitride, a carbonitride, an oxynitride and a carboxynitride of $(Al_{1-a-b-c}Cr_aV_bSi_c)$ $(0 \leq a \leq 0.4, 0 \leq b \leq 0.4, 0 \leq c \leq 0.2, a + b \neq 0, 0 < a + b + c < 1)$.

6. The surface-coated cutting tool according to claim 1, wherein

the coating film further comprises an intermediate layer formed between the base surface and the hard layer, and

said intermediate layer is constituted of any of a nitride of Ti, a nitride of Cr, Ti and Cr.

7. The surface-coated cutting tool according to claim 6, wherein

the thickness of the intermediate layer is at least 0.005 μm and not more than 0.5 μm.

8. The surface-coated cutting tool according to claim 1, wherein

the base is constituted of any of WC-based cemented carbide, cermet, high-speed steel, ceramics, a cubic boron nitride sintered body, a diamond sintered body, a silicon nitride sintered body and a sintered body containing aluminum oxide and titanium carbide.

9. The surface-coated cutting tool according to claim 1, wherein

the surface-coated cutting tool is any of a drill, an end mill, a cutting edge-replaceable insert for milling, a cutting edge-replaceable insert for turning, a metal saw, a gear cutting tool, a reamer and a tap.

10. The surface-coated cutting tool according to claim 1, wherein the coating film is applied by physical vapor deposition.

11. The surface-coated cutting tool according to claim 10, wherein the physical vapor deposition is arc ion plating or magnetron sputtering.